

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

What is claimed is:

1. A substrate carrier that is capable of receiving a vacuum, and holds a substrate from a backside of the substrate during processing of the substrate, such that
5 when a solution is disposed on a front side of the substrate, the solution is prevented from reaching an inner region of a base and a backside inner region of the substrate, the substrate carrier comprising:

the base for placing the substrate thereon;

a vacuum inlet disposed within the inner region of the base, the vacuum inlet
10 connectable to the vacuum to allow the backside of the substrate to be held on the base;

a sealing member disposed on the base and defining the inner region of the base, the sealing member adapted to contact the back side of the substrate to thereby establish the backside inner region of the substrate, and assist in preventing the solution from reaching the backside inner region of the substrate during the processing of the
15 substrate; and

a sealing mechanism disposed outside of the sealing member, the sealing mechanism adapted to assist in preventing the solution from reaching the backside inner region of the substrate during the processing of the substrate.

20 2. The substrate carrier according to claim 1 wherein the sealing mechanism includes at least one opening disposed outside of and around the sealing member, the opening connectable to a fluid source that emits a gaseous fluid from the opening

toward a peripheral back portion of the substrate, thereby assisting in preventing the solution from reaching the backside inner region of the substrate.

3. The substrate carrier according to claim 2 wherein the sealing member is made
5 of an elastomer and is one of an o-ring and an inflatable membrane.

4. The substrate carrier according to claim 2 wherein the at least one opening is a second plurality of holes disposed concentrically around the sealing member.

10 5. The substrate carrier according to claim 4 wherein a diameter of each of the second plurality of holes is in a range of 0.5-1 mm.

6. The substrate carrier according to claim 2 wherein the fluid source emits the gaseous fluid at a flow rate of 10-60 liters per minute.

15

7. The substrate according to claim 2 wherein the fluid source emits the gaseous fluid during the processing of the substrate, and does not emit the gaseous fluid during a subsequent processing of the substrate.

20 8. The substrate carrier according to claim 1 wherein the sealing mechanism includes another sealing member, the another sealing member disposed outside of and around the sealing member and adapted to contact the back side of the substrate and

thereby assist in preventing the solution from reaching the backside inner region of the substrate.

9. The substrate carrier according to claim 8 wherein the another sealing member is
5 an inflatable sealing member.

10. The substrate carrier according to claim 9 wherein the inflatable sealing member is inflated during the processing of the substrate, and is not inflated during a subsequent processing of the substrate.

10

11. The substrate carrier according to claim 9 wherein the inflatable sealing member is inflated by a gas that is provided through a second plurality of holes that are formed in the base.

15 12. The substrate carrier according to claim 8 wherein the another sealing member is an o-ring.

13. The substrate carrier according to claim 12 wherein the sealing member is a hollow o-ring.

20

14. The substrate carrier according to claim 13 wherein both the sealing member and the another sealing member are made from an elastomer material.

15. The substrate carrier according to claim 14 wherein the another sealing member is another hollow o-ring.

5 16. The substrate carrier according to claim 13 wherein the hollow o-ring has a durometer rating of less than 50.

17. The substrate carrier according to claim 12 wherein the another o-ring is disposed in a vertically moveable annular housing that is adapted to position the another
10 o-ring in a seal position and an unsealed position.

18. A deposition apparatus for applying a conductor from an electrolyte to a front face of a substrate, the apparatus also using a vacuum, and comprising:

an electrochemical deposition apparatus adapted to apply the conductor from the
15 electrolyte to the front face of the substrate; and

a substrate holder adapted to hold the substrate from a back face of the substrate in a proper position when the electrochemical deposition apparatus applies the conductor to the front face of the substrate and prevent the electrolyte from reaching an inner region of the base and a backside inner region of the substrate, the substrate holder
20 including:

a base for placing the substrate thereon;

a vacuum inlet disposed within the inner region of the base, the vacuum inlet connectable to the vacuum to allow the backside of the substrate to be held on the base; and

5 a sealing member having a durometer rating of less than 70 disposed on the base and defining the inner region of the base, the sealing member adapted to contact the back side of the substrate to thereby establish the backside inner region of the substrate, and, upon application of the vacuum, hold the substrate to the base, and wherein the sealing member is adapted to prevent the solution from reaching the backside inner region of the substrate during the processing of
10 the substrate.

19. An apparatus according to claim 18 wherein the sealing member is an elastomeric hollow o-ring having a durometer rating of less than 70.

15 20. An apparatus according to claim 19 wherein the elastomeric hollow o-ring has a durometer rating within the range of 30-50.

21. An apparatus according to claim 19 further including a support pad disposed on the base, the support pad having a thickness such that the elastomeric
20 hollow o-ring extends at least 50 microns above a surface of the support pad.

22. An apparatus according to claim 19 wherein a hardness of the support pad is at least 5 times the hardness of the elastomeric hollow o-ring.

23. An apparatus according to claim 19 wherein the elastomeric hollow o-ring has a diameter of between 1-4 mm and a wall thickness of between .5 and 1.5 mm.

24. An apparatus according to claim 18 wherein the sealing member is an elastomeric inflatable membrane.

25. An apparatus according to claim 18 further including a support pad disposed on the base, the support pad having a thickness such that the sealing member extends at least 50 microns above a surface of the support pad.

26. An apparatus according to claim 25 wherein a hardness of the support pad is at least 5 times the hardness of the sealing member.

27. A method of processing a frontside of a substrate using a processing solution and cleaning a peripheral backside of a substrate using a cleaning solution comprising the steps of:

attaching the substrate to a wafer holder, the wafer holder including inner and outer sealing mechanisms, such that the inner sealing mechanism provides a continuous

permanent seal during processing and cleaning and the outer sealing mechanism can intermittently apply a permanent seal;

applying the permanent seal to the outer sealing mechanism;

processing the frontside of the substrate using the processing solution when the

5 permanent seal is applied to the outer sealing mechanism, thereby substantially preventing the processing solution from reaching the inner sealing mechanism;

upon completion of processing the frontside of the substrate, removing the permanent seal from the outer sealing mechanism; and

cleaning the peripheral backside of the substrate using the cleaning solution

10 when the permanent seal remains removed from the outer sealing mechanism.

28. The method according to claim 27 wherein the step of processing the frontside of the substrate performs electrochemical deposition of a conductor using an electrolyte as the processing solution.

15

29. The method according to claim 28 wherein:

the step of applying the permanent seal to the outer sealing mechanism uses a gaseous fluid that is emitted from the substrate holder to a peripheral back side portion of the substrate; and

20 the step of removing the permanent seal stops the emission of the gaseous fluid from the substrate holder.

30. The method according to claim 28 wherein:

the step of applying the permanent seal to the outer sealing mechanism inflates an inflatable membrane; and

the step of removing the permanent seal deflates the inflatable membrane.

5

31. The method according to claim 28 wherein:

the step of applying the permanent seal to the outer sealing mechanism moves an o-ring attached to a vertically moveable chamber to a seal position; and

the step of removing the permanent seal retracts the vertically moveable chamber

10 and the o-ring to result in an unsealed position.

32. The method according to claim 27 wherein the step of processing the

15 frontside of the substrate performs electrochemical deposition of a conductor using an electrolyte as the processing solution and electropolishing using a pad for polishing of the substrate.

33. The method according to claim 32 wherein:

20 the step of applying the permanent seal to the outer sealing mechanism uses a gaseous fluid that is emitted from the substrate holder to a peripheral back side portion of the substrate; and

the step of removing the permanent seal stops the emission of the gaseous fluid from the substrate holder.

34. The method according to claim 32 wherein:

5 the step of applying the permanent seal to the outer sealing mechanism inflates an inflatable membrane; and

the step of removing the permanent seal deflates the inflatable membrane.

10 35. The method according to claim 32 wherein:

the step of applying the permanent seal to the outer sealing mechanism moves an o-ring attached to a vertically moveable chamber to a seal position; and

the step of removing the permanent seal retracts the vertically moveable chamber and the o-ring to result in an unsealed position.

15

36. The method according to claim 27 wherein:

the step of applying the permanent seal to the outer sealing mechanism uses a gaseous fluid that is emitted from the substrate holder to a peripheral back side portion of the substrate; and

20 the step of removing the permanent seal stops the emission of the gaseous fluid from the substrate holder.

37. The method according to claim 27 wherein:

the step of applying the permanent seal to the outer sealing mechanism inflates
an inflatable membrane; and

the step of removing the permanent seal deflates the inflatable

5 membrane.

38. The method according to claim 27 wherein:

the step of applying the permanent seal to the outer sealing mechanism moves an
o-ring attached to a vertically moveable chamber to a seal position; and

10 the step of removing the permanent seal retracts the vertically moveable chamber
and the o-ring to result in an unsealed position.